In section 1 of the Detailed Action, the Examiner noted that corrected drawings were required by the Draftsperson. Formal drawings will thus be provided when the application is allowed.

In section 2 of the Action, the Examiner noted that the listing of references in the specification was not and IDS. It is anticipated that an IDS including the noted references will be filed in due course.

In sections 3-5 of the Action, the specification was objected to for formal matters. A substitute specification is now being prepared and will be filed in due course to overcome the problems noted in sections 3-4. With respect to the direction in section 5 to delete the noted section headings, it is assumed that this direction has been made in error as 37 CFR 1.77(b) specifically suggests that the noted section headings and following phrases be provided.

In section 7, the Examiner noted the incorrect dependencies of certain claims. By this Amendment, the noted dependencies and others have been corrected.

In section 9, claims 2, 4 and 18-19 were rejected under 35 USC § 112 for having improper antecedent basis problems. By this Amendment, the noted problems have been corrected.

In sections 11, 13 and 14, claims 1-5 and 18-27 were all rejected as being anticipated by or obvious over the Naoi patent with or without the Engle patent as noted. However, for the following reasons, it is submitted that amended independent claims 1, 18 and 22 are all allowable over these references taken either singly or in combination.

The present invention is now claimed as including the two camera (especially stereo) version as depicted for example in figures 1c and 1d. The use of two cameras in

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this manner and for the purpose of inputting data about the movements of datums related to a person as the person moves in three dimensions is neither disclosed nor made obvious by Naoi patent or the Engle patent, taken singly or in combination.

Therefore, for the foregoing reasons, it is submitted that amended independent claims 1, 18 and 22 are all allowable over the Naoi patent and the Engle patent. For these same reasons, it is submitted that dependent claims 2-5, 19-21, and 23-30 are similarly allowable.
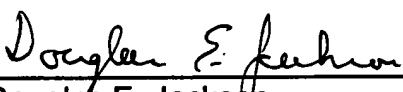
It is further submitted that the use of the multiple cameras to provide stereo images is also neither disclosed nor made obvious by the cited references so that dependent claims 27, 29 and 30 are additionally allowable for this reason.

The remaining references which were cited but not applied have been reviewed but are not believed to be pertinent to the patentability of the present invention.

For all of the foregoing reasons, it is submitted that the present application is in condition for allowance and such action is solicited.
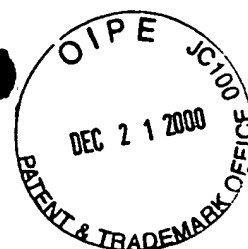
Respectfully submitted,

Date: March 6, 2000

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ATTACHMENT A

Clean Replacement/New Claims (entire set of pending claims)
Clean Replacement/New Claims

Following herewith is a clean copy of the entire set of pending claims.
Replace the previous claims having the same numbers with the following clean copy of those claims.

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1. (amended) Apparatus for input by a person of data to a computer having a display comprising:

    one or more datums associated with said person, said datums being distinguishable in reflected light;

    at least two TV cameras having an output;

    means for determining, from said TV cameras outputs, the three dimensional position or orientation of said datum or datums;

    means for creating on a display, a representation of at least one object; and

    means for modifying, manipulating, or positioning said at least one object representation on said display as a function of the position or orientation of datum or datums .

2. (amended) Apparatus according to claim 1, further including a light source means for directing light at said person.

3. (amended) Apparatus according to claim 1, wherein at least one of said datums is retroreflective.

4. (amended) Apparatus according to claim 1, wherein at least one of said datums is a natural feature of said person.

5. (amended) Apparatus according to claim 2, wherein said light source is an LED light source.

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18.   (amended) A method by which a person may input data to a computer, the method comprising:

providing a datum associated with said person;

providing at least two spaced TV cameras, each camera having an associated light source to provide an illumination field of objects imaged by said cameras;

detecting radiation reflected from said datum within the illumination field to create at least one TV image containing an image of said person;

determining from said TV image information concerning the position and/or orientation of said datum in three dimensions; and

providing a desired input to said computer using said determined information.

19.   (amended) A method according to claim 18, wherein said person contains at least one retroreflective datum.

20.   (amended) A method according to claim 18, wherein said light source is an LED light source.

21.   (amended) A method according to claim 18, wherein said light source is substantially invisible.

22.   (amended) A method for input of information by a person to a computer having a display representing at least one object, comprising the steps of:

providing at least one datum associated with said person;

electro-optically determining, using a multiplicity of TV cameras, the position of the at least one datum in three dimensions;

providing a representation of at least one computer generated virtual object on said display; and

using said determined position or orientation data, manipulating said object displayed by said computer to provide a desired visual display or audio response.

23.   (amended) A method according to claim 22, wherein the at least one datum is retroreflective.

24.   (amended) A method according to claim 22, wherein said datum is distinctive in color.

25.   (amended) A method according to claim 22, wherein said datum is a distinctive shape.

27.   (amended) A method according to claim 22, wherein said cameras provide stereo pair of images of said datum.

28.   (amended) A method according to claim 22, wherein said cameras look at different sides of said datum.

29.   (new) A method according to claim 18, wherein said cameras provide stereo pair of images of said datum.

30.   (new) Apparatus according to claim 9, wherein said cameras provide a stereo pair of images of said datums.

ATTACHMENT B

Marked Up Replacement Claims

Following herewith is a marked up copy of all rewritten claims together with any other pending claims.

1.   (amended) Apparatus for input by a person of data to a computer having a display comprising:

one or more datums ~~means provided on~~ associated with said person, said datums ~~means~~ being distinguishable in reflected light;

at least ~~one~~ two TV cameras having an output;

means for determining, from said TV cameras outputs, the three dimensional position ~~of said datums and/or the~~ orientation of ~~a portion of said person~~ said datum or datums;

means for creating on ~~said~~ a display, a representation of at least one object;~~,~~ and;

means for modifying, manipulating, or positioning said at least one object representation on said ~~screen~~ display as a function of the position or orientation of datum or datums ~~or person~~.

2.   (amended) Apparatus according to claim 1, further including a light source means for directing light at said ~~member~~ person.

3.   (amended) Apparatus according to claim 1, wherein at least one of said datums is retroreflective.

4.   (amended) Apparatus according to claim 1, wherein at least one of said datums is a natural feature of said ~~member~~ person.

5.   (amended) Apparatus according to claim 2, wherein said light source is an LED light source.

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18.   (amended) A method by which a person may input data to a computer, the method comprising:

providing a ~~target on~~datum associated with said person;

~~providing a source of light to create an illumination field;~~

providing at least ~~one~~ two spaced TV cameras, each camera having ~~proximate~~ said an associated light source ~~such that the camera can detect reflection of light from said object in said~~ to provide an illumination field of objects imaged by said cameras;

detecting radiation reflected from said datum within the illumination field to create at least one TV image containing an image of said person;

determining from said TV image information concerning the position and/or orientation of said ~~target~~datum in three dimensions; and

providing a desired input to said computer using said determined information.

19.   (amended) A method according to claim ~~20~~18, wherein said ~~member~~person contains at least one retroreflective datum.

20.   (amended) A method according to claim ~~20~~18, wherein said light source is an LED light source.

21.   (amended) A method according to claim ~~20~~18, wherein said light source is substantially invisible.

22.   (amended) A method for input of information by a person to a computer having a display representing at least one object, comprising the steps of:

providing at least one datum associated with said person;

electro-optically determining, using a multiplicity of TV cameras, the position of the at least one datum ~~on said person~~ in ~~3~~three dimensions;

providing a representation of at least one computer generated virtual object on said display; and

using said determined position or orientation data, manipulating said object displayed by said computer to provide a desired visual display or audio response.

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23. (amended) A method according to claim ~~24~~ 22, wherein the at least one ~~of said~~ datums is retroreflective.

24. (amended) A method according to claim 22, ~~24~~ wherein said datum is distinctive in color.

25. (amended) A method according to claim 22, ~~24~~ wherein said datum is a distinctive shape.

26. (canceled)

27. (amended) A method according to claim 22, ~~24~~ wherein said cameras provide stereo pair of images of said datum.

28. (amended) A method according to claim 22, ~~24~~ wherein said cameras look at different sides of said datum.

29. (new) A method according to claim 18, wherein said cameras provide stereo pair of images of said datum.

30. (new) Apparatus according to claim 9, wherein said cameras provide a stereo pair of images of said datums.

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